extracting an ion beam, a second electrode having a centered aperture being disposed a distance from said first electrode that is between said first electrode and a neutron generating target positioned outside said plasma chamber, and a third electrode having a centered aperture being disposed a distance from the second electrode that is between said second electrode and said neutron generating target, all three apertures aligned for extracting the ion beam from the plasma chamber, the ion beam being a tritium, or deuterium and tritium ion beam;

said neutron generating target electrically connected to ground, said neutron generating target including a tapered conical concave surface having an apex, the concave surface having a target surface area into which ions in the ion beam impact, the concave target surface area being shaped and disposed so that the ions impact the target surface area at angles from normal to the target surface area that are greater than zero degrees, and said neutron generating target being disposed outside and away from said plasma chamber and positioned so that the extracted ion beam is incident thereon to load the target and generate neutrons by reactions.

2-3. (canceled)

4. The neutron generator of claim 1 wherein the acceleration system accelerates the ions to an energy of the order of about 100 keV.

5. The neutron generator of claim 1 wherein the plasma ion source chamber is made of quartz or ceramic.

6. The neutron generator of claim 1 wherein the target is close to the ion source.

7. The neutron generator of claim 6 wherein the generator has a length of about 2 cm or less and a diameter of about 8 mm or less.

8. The neutron generator of claim 1 wherein the target is separated from the ion source by a drift tube.

9. (canceled)

10. The neutron generator of claim 8 wherein the ion source has a diameter of about 2 cm or less and a length of about 2.5 cm or less, and the drift tube has a diameter of about 5 mm or less and a length on the order of about 10 cm.

11. The neutron generator of claim 8 wherein the drift tube has a cooling channel.

12. (canceled)

13. The neutron generator of claim 1 wherein the target has cooling channels.

14. The neutron generator of claim 1 wherein the ion source chamber has a diameter of about 10 cm.

15. The neutron generator of claim 14 wherein the extraction system is a multibeamlet extraction system for extracting ion current densities of at least about 100 mA/cm^2.

16. The neutron generator of claim 1 wherein the ion source is operated at a pressure of several mTorr.

17. The neutron generator of claim 1 wherein the target is sufficiently long to form a line source.

18. (canceled)

19. The neutron generator of claim 1 further comprising an RF generator and a matching network through which the RF antenna is connected to the RF generator.

20. The neutron generator of claim 1 further comprising a plasma confinement solenoid surrounding the RF antenna.

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